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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/855,943	MIYAZAKI, TAKAO	
	Examiner	Art Unit	
	Peter K. Huntsinger	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 5/2/07 have been fully considered but they are not persuasive.

The applicant argues on page 15 of the response in essence that: Suzuki '361 does not disclose detecting a print defect based on whether a difference between recorded data and reference data exceeds a predetermined threshold.

a. Suzuki '361 discloses detecting a print defect based on whether a difference between recorded data and reference data exceeds a predetermined threshold (col. 21-22, lines 60-67, 1-13, detects whether the recording unevenness is more than a given value).

The applicant argues on page 16 of the response in essence that: Suzuki '361 does not provide correction in the thermal printer of Aosaki '198.

b. In response to applicant's argument that Suzuki '361 does not provide for correction in a thermal printer, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

The applicant argues on page 17 of the response in essence that: Suzuki '361 does not provide correction in the ink sublimation printer of Saito '789.

c. In response to applicant's argument that Suzuki '361 does not provide correction in an ink sublimation printer, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

The applicant argues on pages 17 and 18 of the response in essence that: The correction does not relate to the density defect region in Tanaka '855.

d. Suzuki '361 discloses performing correction relative to the defective portion (col. 24, lines 16-22+).

The applicant argues on page 18 of the response in essence that: Tanaka '855 does not teach performing defect detection in the reverse scan and correction in the forward scan.

e. Tanaka '855 teaches performing defect detection in the reverse scan and correction in the forward scan (col. 20, lines 13-20, performs complementary printing in the main scan and reading printing data in the reverse scan).

The applicant argues on page 19 of the response in essence that:

Tanaka '855 does not teach defect detection and correction occurring on the same line pattern.

f. Suzuki '361 discloses performing correction relative to the defective portion during the same recording operation (col. 24, lines 16-22+).

The applicant argues on page 19 of the response in essence that:

Noyes '022 does not teach sensors that relate to density.

g. Noyes '022 teaches a second density measuring means (photo sensor on 37a of Fig. 5, col. 16-17, lines 66-67, 1-2+). A photo sensor is used to measure density.

The applicant argues on page 20 of the response in essence that:

Noyes '022 does not teach measuring density when moved backwards.

h. Noyes '022 teaches obtaining a measured density of a recorded portion just after recording when said carriage is moved backward (col. 86, lines 30-34+). The measurement occurs after each scan (forward and backwards).

The applicant argues on pages 20 and 21 of the response in essence that:

Because Suzuki '361 corrects print defects before outputting sheets, there would be no wasted sheets to reduce and therefore no motivation to combine Yamaguchi '764.

i. The motivation to combine Yamaguchi '764 with Suzuki '361 is to reduce the amount of wasted sheets. The sheets need only be reused and need not contain print defects for the motivation to be valid.

The applicant argues on page 21 of the response in essence that: Yamaguchi '764 does not teach defects on the row of the medium.

j. Suzuki '361 discloses print defects occurring on the print medium.

Claim Objections

2. Claims 22, 23, and 34 are objected to because of the following informalities: In line 8 of claim 22, add the word "on" between "based whether". Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3, 6, 11, 12, 27, 28, 31, 36, and 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Suzuki et al. '361.

Referring to claim 1, Suzuki et al. '361 discloses a serial printing method (col. 11, lines 52-67+) for recording an image on a recording material one line by one line, said line including one or more rows and said line being recorded by moving a recording head in a width direction of said recording material, said serial printing method comprising the steps of: recording said row with said recording head on said recording material (S161 of Fig. 32, col. 24, lines 16-22+);

detecting whether or not a print defect occurs on said recorded row on said recording material (S162 of Fig. 32, col. 24, lines 16-22+) based on whether a difference between recorded data and reference data exceeds a predetermined threshold (col. 21-22, lines 60-67, 1-13, detects whether the recording unevenness is more than a given value);

and performing correction recording, on said recording material, relative to said row on which said print defect occurs based on whether the difference exceeds the threshold (S171 of Fig. 32, col. 24, lines 29-44+).

Referring to claim 2, Suzuki et al. '361 discloses wherein said line includes a plurality of said rows respectively recorded with recording elements of said recording head (col. 24, lines 29-44+).

Referring to claim 3, Suzuki et al. '361 discloses wherein said print defect of said row is detected by measuring a density of each pixel constituting said row, and said correction recording is performed relative to said pixel on which a lack of density occurs (col. 19, lines 8-18+).

Referring to claim 6, Suzuki et al. '361 discloses wherein said recording head is an ink-jet recording head for recording said image by jetting ink to said recording material (col. 5-6, lines 63-67, 1-3+).

Referring to claim 11, Suzuki et al. '361 discloses a serial printing method for recording an image on a recording material one line by one line, said line including a plurality of rows of which recording is performed by moving a recording head in a sub-scanning direction which is a width direction of said recording material, and said recording head having a plurality of recording elements arranged in a main-scanning direction perpendicular to said sub-scanning direction, said serial printing method comprising the steps of: recording said rows with said recording head (S161 of Fig. 32, col. 24, lines 16-22+);

detecting the broken recording element among said recording elements, said broken recording element being impossible to record due to its failure (col. 4, lines 7-10+), based on whether a difference between a value output by the broken recording element and a reference value exceeds a predetermined threshold (col. 21-22, lines 60-67, 1-13, detects whether the recording unevenness is more than a given value);

and recording said row to be recorded with said broken recording element, by moving said recording head again and by using another normal recording element among said recording elements when the difference exceeds the predetermined threshold, wherein recording said row again occurs on the same sheet of the recording material as the previous recording (S171 of Fig. 32, col. 24, lines 29-44+).

Referring to claim 12, Suzuki et al. '361 discloses wherein said broken recording element is detected by measuring a density of said row (col. 9, lines 8-18+).

Referring to claim 27, Suzuki et al. '361 discloses wherein both recording the image and correction recording are performed on said recording material where the print defect was detected (col. 24, lines 29-44+).

Referring to claim 28, Suzuki et al. '361 discloses wherein said print defect is both detected and corrected on said recording material having the lack of pixel density (col. 24, lines 29-44+).

Referring to claim 31, Suzuki et al. '361 discloses wherein the row to be recorded with the broken recording element is on said recording material, and wherein the recording head records again with a normal element on said recording material (col. 24, lines 29-44+).

Referring to claim 36, Suzuki et al. '361 discloses wherein recording said row, detecting a print defect on said recorded row, and performing correction recording on said row occur during a same recording operation (col. 24, lines 29-44+).

Referring to claim 38, Suzuki et al. '361 discloses wherein serial printing further comprises recording each row by a single element of the recording head which is scanned in the width direction of said recording material (col. 11, lines 55-67+)

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '361 as applied to claim 1 above, and further in view of Aosaki et al. '198.

Referring to claim 4, Suzuki et al. '361 discloses a recording material and a recording head but do not disclose expressly utilizing thermosensitive recording paper.

Aosaki et al. '198 discloses wherein said recording material is a thermosensitive recording paper including a thermosensitive coloring layer, and said recording head is a thermal head for recording said image by heating said thermosensitive coloring layer (col. 7, lines 46-53+).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize thermosensitive recording paper and a thermal head. The motivation for doing so would have been to reduce the size of the printer. Suzuki et al. '361 discloses a generic printer, but does not provide specific details of the printer, and Aosaki et al. '198 simply provides the standard details. Therefore, it would have been obvious to combine Aosaki et al. '198 with Suzuki et al. '361 to obtain the invention as specified in claim 4.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '361 as applied to claim 1 above, and further in view of Saito '789.

Referring to claim 5, Suzuki et al. '361 discloses a recording material and a recording head but do not state utilizing thermally melted ink.

Saito '789 discloses wherein said recording head is a thermal head for heating an ink ribbon from its back side, said image being recorded by transferring one of thermally melted ink and thermally sublimated ink onto a surface of said recording material (col. 3, lines 12-17).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the thermally melted ink of Saito '789 with the printing system of Suzuki et al. '361. The motivation for doing so would have been to reduce the printing noise. Suzuki et al. '361 discloses a generic thermal printer, but doesn't provide details of the printer, and Saito simply provides the standard details. Therefore, it would have been obvious to combine Saito with Suzuki et al. '361 to obtain the invention as specified in claim 5.

8. Claims 7, 9, 10, 29, 37, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '361 in view of Takanaka '855.

Referring to claim 7, Suzuki et al. '361 discloses a serial printer including a carriage and a recording head held thereby, said carriage being reciprocated in a sub-scanning direction which is a width direction of a recording material, and said recording head recording a predetermined number of rows on said recording material in accordance with image data during the forward movement of said carriage, said serial printer comprising: density measuring means attached to said carriage and for obtaining a measured density of a recorded portion when said carriage is moved (col. 24, lines 16-22+);

density predicting means for obtaining a predicted density to be recorded on said portion, based on said image data (col. 19, lines 8-18+);

operation means for comparing said measured density with said predicted density every portion, said operation means obtaining density difference when said measured density is less than said predicted density (col. 19, lines 8-18+);

record correcting means for performing correction recording relative to the defective portion having said density difference, said record correcting means reciprocating said carriage again for the defective portion and driving said recording head in accordance with said density difference (col. 24, lines 16-22+);

and recording-material advancement means for advancing a sheet of said recording material in a main-scanning direction perpendicular to said sub-scanning direction, in order to record the next predetermined number of the rows on said recording material (col. 24, lines 50-52), wherein on the same sheet of the recording material, detection of the density difference and correction recording relative to the defective portion having said density difference are performed.

Suzuki et al. '361 does not disclose expressly the density measuring means measuring density when moved backwards and performing correction recording when moved forward.

Takanaka '855 discloses measuring density when moving backwards and performing correction recording when moving forward (col. 20, lines 13-20+).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to measure density in the reverse direction and perform correction

recording in the forward direction. The motivation for doing so would be to allow the printer to print all data in the forward direction and avoid any image degradation caused by printing in both directions. Therefore, it would have been obvious to combine Takanaka '855 with Suzuki et al. '361 to combine the invention as specified in claim 7.

Referring to claim 9, Suzuki et al. '361 discloses wherein said density measuring means includes a light emitting element for illuminating said recorded portion, and a light receiving element for converting the reflected light into an electric signal (col. 21-22, lines 60-67, 1+).

Referring to claim 10, Suzuki et al. '361 discloses wherein said portion is a single pixel (col. 13, lines 44-45+).

Referring to claim 29, Suzuki et al. '361 discloses wherein said operation means obtains the density difference on said recording material, and wherein the record correcting means corrects said density difference on said recording material (col. 24, lines 29-44+).

Referring to claim 37, Suzuki et al. '361 discloses wherein obtaining a measured density of a recorded portion, obtaining a predicted density to be recorded on said portion, comparing said measured density with said predicted density every portion, and performing correction recording to the defective portion occur during a same recording operation (col. 24, lines 29-44+).

Referring to claim 39, Suzuki '361 discloses wherein the correcting means performs correction recording relative to the defective portion when the density

difference exceeds a predetermined threshold (col. 21-22, lines 60-67, 1-13, detects whether the recording unevenness is more than a given value).

9. Claims 8, 10, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '361, and further in view of Noyes et al. '022.

Referring to claim 8, Suzuki et al. '361 discloses a serial printer including a carriage and a recording head held thereby, said carriage being reciprocated in a sub-scanning direction which is a width direction of a recording material, and said recording head recording a predetermined number of rows on said recording material in accordance with image data during the reciprocation of said carriage, said serial printer comprising: first density measuring means disposed on one side of said recording head in said sub-scanning direction, first density measuring means obtaining a measured density of a recorded portion just after recording when said carriage is moved forward (col. 24, lines 16-22+);

density predicting means for obtaining a predicted density to be recorded on said portion, based on said image data (col. 19, lines 8-18+);

operation means for comparing said measured density with said predicted density every portion, said operation means obtaining density difference when said measured density is less than said predicted density (col. 19, lines 8-18+);

record correcting means for performing correction recording relative to the defective portion having said density difference, said record correcting means reciprocating said carriage again for the defective portion and driving said recording

head in accordance with said density difference during the forward movement of said carriage (col. 24, lines 16-22+);

and recording-material advancement means for advancing a sheet of said recording material in a main-scanning direction perpendicular to said sub-scanning direction, in order to record the next predetermined number of the rows on said recording material (col. 24, lines 50-52+), wherein on the same sheet of the recording material, detection of the density difference and correction recording relative to the defective portion having said density difference are performed.

Suzuki et al. '361 does not disclose expressly a second density measuring means for measuring density backwards.

Noyes et al. disclose second density measuring means disposed on the other side of said recording head in said sub-scanning direction, said second density measuring means (photo sensor on 37a of Fig. 5, col. 16-17, lines 66-67, 1-2+) and obtaining a measured density of a recorded portion just after recording when said carriage is moved backward (col. 86, lines 30-34+).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to allow the density to be measuring while the carriage is moving backward. The motivation for doing so would be to allow the printer to utilize only one density measuring means if needed. Therefore, it would have been obvious to combine Noyes et al. '022 with Suzuki et al. '361 to combine the invention as specified in claim 8.

Referring to claim 10, Suzuki et al. '361 discloses wherein said portion is a single pixel (col. 13, lines 44-45+).

Referring to claim 30, Suzuki et al. '361 discloses wherein the density difference for the defective portion is measured on said recording material, and wherein correction recording for the defective portion is performed on said recording material (col. 24, lines 29-44+).

10. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '361 as applied to claim 11 above, and further in view of Tanaka et al. '341.

Referring to claim 13, Suzuki et al. '361 discloses detecting a density by said recording head but do not disclose expressly measuring the density of a test pattern.

Tanaka et al. '341 discloses wherein a broken recording element is detected by measuring a density of a test pattern recorded by a recording head (Fig. 3, col. 9, lines 1-6+).

At the time of the invention, it would have obvious to a person of ordinary skill in the art to measure density in a test print. The motivation for doing so would have been to verify all nozzles in a print jet are functioning correctly. The advantage of a test print over testing an ordinary document is that the test print ensures that each print element is tested and a print element in printing an ordinary document may not be tested. Therefore, it would have been obvious to combine Tanaka et al. '341 with Suzuki et al. '361 to obtain the invention as specified in claim 13.

Referring to claim 14, Tanaka et al. '341 discloses wherein said test pattern is arranged at a lateral side of said row in said sub-scanning direction (Fig. 3, col. 9, lines 1-6+).

Referring to claim 15, Tanaka et al. '341 discloses wherein said test pattern is arranged at a downstream side of said row in said main-scanning direction (Fig. 3, col. 9, lines 1-6+).

11. Claims 16-21, 28, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '361, and further in view of Schantz '720.

Referring to claim 16, Suzuki et al. '361 discloses a serial printer including a carriage reciprocated in a sub-scanning direction which is a width direction of a recording material, a recording head held by said carriage, and moving means for moving said recording material in a main-scanning direction perpendicular to said sub-scanning direction, said recording head having M (M is an integer of two or more) recording elements arranged in said main-scanning direction to record said M rows on said recording material during the movement of said carriage, said serial printer comprising: density measuring means attached to said carriage and for obtaining a measured density of said row recorded by said recording head (col. 19, lines 8-18+);

failure judging means for judging the row as the defective row when a difference between said measured density and a reference value is more than a predetermined threshold (col. 21-22, lines 60-67, 1-13, detects whether the recording unevenness is more than a given value), said failure judging means judging the corresponding recording element as the broken recording element (col. 4, lines 7-10+);

wherein, on a same sheet of the recording medium, the failure judging means judges the defective row and the control means controls the recording element to record (S171 of Fig. 32, col. 24, lines 29-44+).

Suzuki et al. '361 does not disclose expressly moving said recording medium successively in accordance with a number of normal recording elements.

Schantz '720 discloses control means for controlling drive of said recording element, reciprocation of said carriage, and movement of said recording material, when all of said recording elements are normal (paper motion control device 24 of Fig. 1, col. 3, lines 59-64+), said control means controlling the record under a condition that said recording element is moved every M rows (number of printing elements), and when said failure detecting means detects said broken recording element, said control means controlling the record such that said recording material is moved by at least one row in said main-scanning direction to record with the normal recording element relative to said defective row (col. 3, lines 24-34+), and successively the record being continued under a condition that said recording material is moved, in said main-scanning direction, in accordance with a number of the normal recording elements (col. 5, lines 31-55+).

At the time of the invention, it would have obvious to a person of ordinary skill in the art to move a recording medium successively according to the number of working recording elements. The motivation for doing so would have been to improve the speed of printing utilizing only working printing elements. Therefore, it would have been obvious to combine Schantz '720 with Suzuki et al. '361 et al. to obtain the invention as specified in claim 16.

Referring to claim 17, Schantz '720 discloses wherein when a number of the consecutive normal recording elements is N (N is an integer more than one and less than M), recording is performed with the consecutive normal recording elements, the number of which is N, in a condition that said recording material is moved in said main-scanning direction every N rows (col. 5, lines 31-55+).

Referring to claim 18, Suzuki et al. '361 et al. discloses wherein said density measuring means includes a light emitting element for illuminating said recorded row, and a light receiving element for converting the reflected light into an electric signal (col. 21-22, lines 60-67, 1+).

Referring to claim 19, Suzuki et al. '361 discloses a serial printer including a carriage reciprocated in a sub-scanning direction which is a width direction of a recording material, a recording head held by said carriage, and moving means for moving said recording material in a main-scanning direction perpendicular to said sub-scanning direction, said recording head having M (M is an integer of two or more) recording elements arranged in said main-scanning direction to record said M rows on said recording material during the movement of said carriage, said serial printer comprising: density measuring means attached to said carriage and for obtaining a measured density of said row recorded by said recording head (col. 19, lines 8-18+);

failure judging means for judging the row as the defective row when a difference between said measured density and a predetermined value is more than a predetermined threshold (col. 21-22, lines 60-67, 1-13, detects whether the recording

unevenness is more than a given value), said failure judging means judging the corresponding recording element as the broken recording element (col. 4, lines 7-10+);

wherein, on a same sheet of the recording medium, the failure judging means judges the defective row and the control means controls the recording element to record (S171 of Fig. 32, col. 24, lines 29-44+).

Suzuki et al. '361 does not disclose expressly moving said recording medium successively in accordance with a number of normal recording elements.

Schantz '720 discloses control means for controlling drive of said recording element, reciprocation of said carriage, and movement of said recording material, when all of said recording elements are normal (paper motion control device 24 of Fig. 1, col. 3, lines 59-64+), said control means controlling the record under a condition that said recording element is moved every (M-J) rows (J is an integer less than M) to overlap the J rows, and when said failure detecting means detects said broken recording element, said control means controlling the record such that said recording material is moved by at least one row in said main-scanning direction to record with the normal recording element relative to said defective row, and successively the record being continued under a condition that said recording material is moved, in said main-scanning direction, in accordance with a number of the normal recording elements (col. 5, lines 31 –55+).

At the time of the invention, it would have obvious to a person of ordinary skill in the art to move a recording medium successively according to the number of working recording elements. The motivation for doing so would have been to improve the speed of printing utilizing only working printing elements. Therefore, it would have been

obvious to combine Schantz '720 with Suzuki et al. '361 to obtain the invention as specified in claim 19.

Referring to claim 20, Schantz '720 discloses a serial printer according to claim 19, wherein when a number of the consecutive normal recording elements is N (N is an integer more than one and less than M), recording is performed with the consecutive normal recording elements, the number of which is N, in a condition that said recording material is moved in said main-scanning direction every (N-K) rows (K is an integer less than N) to overlap the K rows (col. 5, lines 31 –55+).

Referring to claim 21, Suzuki et al. '361 discloses wherein said density measuring means includes a light emitting element for illuminating said recorded row, and a light receiving element for converting the reflected light into an electric signal (col. 21-22, lines 60-67, 1+).

Referring to claim 32, Schantz '720 discloses wherein said number of normal recording elements is based on a number of consecutive normal recording elements (col. 5, lines 31-55+).

12. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '361, and further in view of Yamaguchi et al. '764.

Referring to claim 22, Suzuki et al. '361 et al. discloses a serial printing method for recording an image on a recording material one line by one line, said line including one or more rows and said line being recorded by moving a recording head of a printer in a width direction of said recording material, said serial printing method comprising the

steps of: detecting whether or not a print defect occurs on said recorded row (S162 of Fig. 32, col. 24, lines 16-22+) based on whether a difference between recorded data and reference data exceeds a predetermined threshold (col. 21-22, lines 60-67, 1-13, detects whether the recording unevenness is more than a given value);

and performing correction recording relative to said row on which said print defect occurs, on said sheet of the recording material based on whether the difference exceeds the threshold (S171 of Fig. 32, col. 24, lines 29-44+).

Suzuki et al. '361 does not disclose expressly discharging a recording material and rerecording on the discharged recording material.

Yamaguchi et al. '764 discloses discharging a recording material on which said image has been recorded, from said printer; setting said discharged recording material to said printer again (col. 2, lines 49-59+).

At the time of the invention, it would have obvious to a person of ordinary skill in the art to rerecord on a printed sheet. The motivation for doing so would have been to reduce the amount of wasted sheets. Therefore, it would have been obvious to combine Yamaguchi et al. '764 with Suzuki et al. '361 to obtain the invention as specified in claim 22.

Referring to claim 23, Suzuki et al. '361 discloses wherein said print defect of said row is detected by measuring a density of said row (col. 19, lines 8-18+).

13. Claims 22 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz '720, and further in view of Yamaguchi et al. '764 and Suzuki '361.

Referring to claim 22, Schantz '720 discloses a serial printing method for recording an image on a recording material one line by one line, said line including one or more rows and said line being recorded by moving a recording head of a printer in a width direction of said recording material, said serial printing method comprising the steps of: detecting whether or not a print defect occurs on said recorded row (col. 3, lines 37-45+);

and performing correction recording relative to said row on which said print defect occurs (col. 3, lines 24-34+).

Schantz '720 does not disclose expressly discharging a recording material and rerecording on the discharged recording material.

Yamaguchi et al. '764 discloses discharging a recording material on which said image has been recorded, from said printer; setting said discharged recording material to said printer again (col. 2, lines 49-59+).

At the time of the invention, it would have obvious to a person of ordinary skill in the art to rerecord on a printed sheet. The motivation for doing so would have been to reduce the amount of wasted sheets.

Schantz '720 does not disclose expressly detecting a print defect based on whether a difference between recorded data and reference data exceeds a predetermined threshold.

Suzuki '361 discloses detecting whether or not a print defect occurs on said recorded row (S162 of Fig. 32, col. 24, lines 16-22+) based on whether a difference between recorded data and reference data exceeds a predetermined threshold (col. 21-

22, lines 60-67, 1-13, detects whether the recording unevenness is more than a given value);

and performing correction recording relative to said row on which said print defect occurs, on said sheet of the recording material based on whether the difference exceeds the threshold (S171 of Fig. 32, col. 24, lines 29-44+).

At the time of the invention, it would have obvious to a person of ordinary skill in the art to utilize a predetermined threshold to determine a print defect. The motivation for doing so would have been to only correct a print defect when it is sufficient to correct the defect (i.e. not correct print defects that are non-existent/not essential). Therefore, it would have been obvious to combine Yamaguchi et al. '764 and Suzuki '361 with Schantz '720 to obtain the invention as specified in claim 22.

Referring to claim 34, Schantz '720 discloses wherein the image on a recording material contains a print defect, and wherein said correction recording corrects the image on said recording material (col. 24, lines 29-44).

Yamaguchi et al. '764 disclose discharging a recording material on which said image has been recorded, from said printer; setting said discharged recording material to said printer again (col. 2, lines 49-59).

The image on said recording material is corrected because the faulty printing element of Schantz '720 has been substituted and the entire image can be reprinted.

14. Claims 24 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '361, and further in view of Ui et al. '984.

Referring to claim 24, Suzuki et al. '361 discloses a serial printer including a carriage reciprocated in a sub-scanning direction which is a width direction of a recording material, a recording head held by said carriage, and moving means for moving said recording material in a main-scanning direction perpendicular to said sub-scanning direction, said recording head recording a predetermined number of rows on said recording material in accordance with image data during the reciprocation of said carriage, said serial printer comprising: image-area detecting means for obtaining positional information of an image area of said recording material already recorded (col. 24, lines 16-22+);

data making means for making correction image data by calculating positional difference between said positional information of said image area and positional information of said image data, said data making means moving said image data in accordance with said positional difference (col. 24, lines 29-44+);

density predicting means for obtaining a predicted density to be recorded on each portion of said image data, based on said correction image data (col. 19, lines 8-18+);

density measuring means attached to said carriage and for obtaining a measured density of said portion of said image area during the movement of said carriage (col. 24, lines 16-22+);

operation means for comparing said measured density with said predicted density every portion, said operation means obtaining density difference of the defective portion have said measured density which is less than said predicted density; record

correcting means for performing correction recording relative to the defective portion having said density difference, said record correcting means moving said carriage again for the defective portion and driving said recording head in accordance with said density difference during the movement of said carriage (col. 24, lines 16-22+) based on whether a difference between recorded data and reference data exceeds a predetermined threshold (col. 21-22, lines 60-67, 1-13, detects whether the recording unevenness is more than a given value), wherein on the same sheet of said recording material, the operation means obtains the density difference of the defective portion and the record correcting means performs correction recording based on whether the difference exceeds the threshold (S171 of Fig. 32, col. 24, lines 29-44+).

Suzuki et al. '361 does not disclose expressly calculating an inclination of the recording sheet.

Ui et al. disclose calculating an inclination and inclining image data in accordance with said inclination (col. 7-8, lines 55-67, 1-12+).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to correct inclination of a printed page. The motivation for doing so would have been to eliminate printing pages that are printed on an undesired angle. Therefore, it would have been obvious to combine Ui et al. '984 with Suzuki et al. '361 to obtain the invention as specified in claim 24.

Referring to claim 35, Suzuki et al. '361 discloses measuring the positional difference between the image area and the image data but does not disclose expressly basing the positional data on a slanted insertion of the recording material.

Ui et al. disclose wherein the recording material having the image area is slanted when inserted in the serial printer, and inclination is determined (col. 4, lines 28-46).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to base the positional difference on the inclination of the sheet. The motivation for doing so would have been to eliminate the error that would occur if the measured positional difference were based on a slanted sheet. Therefore, it would have been obvious to combine Ui et al. '984 with Suzuki et al. '361 to obtain the invention as specified in claim 35.

15. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '361 and Ui et al. '984 as applied to claim 24 above, and further in view of Noyes et al. '022.

Referring to claim 25, Suzuki et al. '361discloses measuring means, but does not disclose expressly measuring a border.

Noyes et al. '022 discloses wherein said image-area detecting means detects a border line between said image area and its surrounding portion by using said density measuring means to detect said image area, under a condition of moving said carriage and moving said recording material by said moving means (col. 15, lines 38-40+).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to measure a border with density measuring means. The motivation for doing so would have been to reduce the inaccuracy in printing alignment patterns.

Therefore, it would have been obvious to combine Noyes et al. '022 with Noyes et al. '022 and Ui et al. '984 to obtain the invention as specified in claim 25.

Referring to claim 26, Suzuki et al. '361 discloses wherein said density measuring means includes a light emitting element for illuminating said recorded portion, and a light receiving element for converting the reflected light into an electric signal (col. 21-22, lines 60-67, 1+).

16. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '361 and Schantz '720 as applied to claim 20 above, and further in view of applicant's admitted prior art.

Referring to claim 33, Suzuki et al. '361 discloses detecting a broken recording element but does not disclose expressly when the broken element is detected, a determination is made whether said broken element is for recording an end row of a line, and when said broken element records the end row of said line, recording is performed with fifty-percent density.

Applicant's prior art teaches when the broken element is detected, a determination is made whether said broken element is for recording an end row of a line, and when said broken element records the end row of said line, recording is performed with fifty-percent density (page 38, lines 3-10).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to detect the end of a row and record said row with fifty percent density. The motivation for doing so would have been to eliminate the streak that occurs

between adjacent lines. Therefore, it would have been obvious to combine the applicant's admitted prior art with Suzuki et al. '361 and Schantz '720 to obtain the invention as specified in claim 33.

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter K. Huntsinger whose telephone number is (571)272-7435. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Moe Aung can be reached on (571)272-7314. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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